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## BRIEFER ARTICLES.

**Studies in nuclear division.**—It may not be generally known that nuclear division, in certain cases at least, may be easily and quickly studied, and a few hints here may not be out of place.

The readiest means of studying this interesting subject is probably to be found in the final divisions of the pollen mother-cells, especially of monocotyledons. I examined a number of plants recently, and among them found two in particular that showed very beautifully all of the stages in the division of the nucleus, including the longitudinal division of the nuclear segments<sup>1</sup>, and were thoroughly typical representatives of the differences in the processes as found in monocotyledons and dicotyledons.

The first of these was *Allium Canadense*, the second *Podophyllum peltatum*.

Young buds must be used, in *Allium* about 2mm. in length; in *Podophyllum* buds were gathered as soon as the plants appeared above ground. In the former case the young anthers were crushed carefully in a drop of acetic acid and water ( $\frac{1}{2}$  acetic acid and  $\frac{1}{2}$  distilled water). With *Podophyllum* cross-sections of the whole bud were made, and the sections of the anthers teased out in the same solution as in the case of *Allium*. The pollen mother-cells are at once recognizable by their thick colorless walls, and it is easy to tell with a low power whether or not the desired division stages are present. If this is the case they may be stained with acetic methyl-green, or better, gentian-violet. In preparing the latter the best results were had by first mixing two parts of distilled water and one of acetic acid. To this mixture a sufficient quantity of a saturated alcoholic solution of gentian-violet was added to give it a deep violet color. If a small drop of this mixture is now added to the preparation containing the pollen cells, the nuclei will be almost instantly colored a deep blue-purple, while the protoplasm remains colorless and entirely uncontracted. The coloring fluid may now be carefully removed with blotting-paper, care being taken, of course, to avoid removing any more of the floating pollen mother-cells than is necessary, and the preparation mounted in dilute glycerine, which must be added very gradually to avoid contraction of the protoplasm. Specimens prepared in this way, especially when first made, show all the finest details of the nuclear structure, and scarcely, if at all, inferior to those prepared by the much more tedious and uncertain methods of fixing by alcohol, chromic or picric acid, etc., staining with hæmatoxylin, carmine or safranin, and mounting in balsam.—DOUGLAS H. CAMPBELL, *Bloomington, Ind.*

<sup>1</sup>The author expects later to publish a more extended account, with figures, of these two plants, with possibly some additional matter bearing on the subject.